

Borehole

51-11-02

Log Event A

Borehole Information

Farm : <u>TX</u>	Tank : <u>TX-111</u>	Site Number : <u>299-W15-72</u>
N-Coord : <u>41,894</u>	W-Coord : <u>75,903</u>	TOC Elevation : <u>670.85</u>
Water Level, ft :	Date Drilled : <u>2/28/1949</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.313</u>	ID, in. : <u>8</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>150</u>	

Borehole Notes:

According to the driller's records, this borehole was perforated but not grouted. The casing was perforated from 40 to 95 ft. According to the driller's record, 19.5 ft of starter casing was installed. The record did not indicate the size of the starter casing or whether it was removed after completion of the borehole.

The casing thickness is presumed to be 0.322 in., on the basis of published thickness for schedule-40, 8-in. steel tubing.

Equipment Information

Logging System : <u>2</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>10/1995</u>	Calibration Reference : <u>GJPO-HAN-3</u>	Logging Procedure : <u>P-GJPO-1783</u>

Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>2/21/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>99.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>57.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>2/22/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>19.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>3</u>	Log Run Date : <u>2/23/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>18.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>58.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

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Log Run Number :	<u>4</u>	Log Run Date :	<u>2/26/1996</u>	Logging Engineer:	<u>Bob Spatz</u>
Start Depth, ft.:	<u>147.0</u>	Counting Time, sec.:	<u>100</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>98.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Log Run Number :	<u>5</u>	Log Run Date :	<u>2/26/1996</u>	Logging Engineer:	<u>Bob Spatz</u>
Start Depth, ft.:	<u>66.0</u>	Counting Time, sec.:	<u>100</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>53.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Analysis Information

Analyst : S.D. Barry

Data Processing Reference : P-GJPO-1787

Analysis Date : 12/3/1996

Analysis Notes :

This borehole was logged in five log runs with one rerun for quality assurance. The pre- and post-survey field verification spectra met the acceptance criteria established for the peak shape and detector efficiency, confirming that the SGLS was operating within specifications. The energy calibration and peak-shape calibration from these spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

A correction factor for a 0.322-in.-thick casing was not available; therefore, a casing correction factor for a 0.330-in.-thick steel casing was applied during analysis. Use of the correction factor for the thicker casing may result in calculated radionuclide concentrations that are slightly higher than the actual concentrations.

The only man-made radionuclide detected in this borehole was Cs-137. The presence of Cs-137 contamination was measured almost continuously from the ground surface to about 9 ft, intermittently to 40 ft, continuously from 40 to 98 ft, and intermittently to the bottom of the borehole. The maximum Cs-137 concentration was 19.9 pCi/g at the ground surface.

KUT concentration profiles show a region of lesser values between 43 and 50 ft. The K-40 concentrations increase from the mean (observed in the upper 50 ft of the borehole) at about 50 ft. The Th-232 log plot shows a region of elevated concentrations between 96 and 106 ft. The U-238 plot shows a small region of increased concentration values between 116 and 119 ft. The K-40 plot shows a region of lesser concentration values between 107 and 120 ft. At 120 ft, the K-40 concentration values begin a gradual decrease.

The interval between 53 and 66 ft was relogged to check the quality of the radionuclide concentration measurements made by the SGLS. The concentrations of the man-made and natural radionuclides were calculated using the separate data sets at the overlapping depths. The concentrations of these radionuclides were within the statistical uncertainty of the measurements, verifying the excellent repeatability of the radionuclide concentration measurements.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks TX-110 and TX-111.



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Log Plot Notes:

Separate log plots show the man-made (Cs-137) and the naturally occurring radionuclides (KUT). The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A rerun plot was generated for the region between 53 and 66 ft. The radionuclide concentrations shown were calculated using the separate data sets provided by the original and rerun logging runs.